NEI 06-11 [Rev 1 Addendum June 2011]

Managing Personnel Fatigue at Nuclear Power Reactor Sites (with Addendum)

June 2011

ADDENDUM

IMPLEMENTATION GUIDANCE FOR MAXIMUM AVERAGE WORK HOURS ALTERNATIVE- 26.205(D)(7)

Maximum Average Work Hours Alternative- the proposed alternative approach to on-line minimum days off (MDO) is a weekly maximum average of 54 hours worked, calculated based on a rolling averaging period of up to 6 weeks. This alternative is applicable to all covered workers.

Implementation Guidance

General:

The transition from MDO to a 54 hr/week averaging approach provides additional flexibility in the scheduling of work hours. The additional flexibility gained reduces the number of mandatory days off and days off are instrumental in managing fatigue. It remains the licensee's responsibility to schedule hours consistent with the objective of preventing impairment from fatigue consistent with the requirements of 26.205(c). This guidance must be included in the procedures required by 26.27 and 26.203 if the alternative of 26.205(d)(7) is implemented.

For example, without the requirement for MDO it would be possible to work every day during an averaging period with the exception of the break days required by 26.205(d)(2), however, this may not be consistent with the requirements of 26.205(c) for scheduling individual's work with the objective of preventing impairment from fatigue.

Averaging Periods:

The averaging period is the duration over which the 54 hr average is calculated and may be consistent with standard shift schedules but may not be greater than 6 weeks.

The averaging period starts "rolling" after a work history for a worker has been established equal to the length of the averaging period. The averaging period rolls by one week at a time. This means that the maximum average work hour calculation must be performed weekly at the time established by the licensee for rolling to the next week. Each licensee has the discretion to establish the point in time during the week when the averaging period rolls forward by one week.

Shifts that bridge the point in time during the week when the averaging period rolls forward by one week, may be counted in one of two ways:

- The hours for that shift may all be included in the week the shift starts, or
- The hours may be included in the weeks they are worked.

A licensee must document in the procedures required by 26.27 and 26.203 the point in time when the week rolls to the next week and which of the two options they are using for counting the shifts that bridge the end of the established week.

> Example 1: Operations Department works a rotating shift that repeats after 5 weeks so the licensee has elected to establish an averaging period for Operations at 5 weeks. The licensee has selected Sunday at 0000 as the end of the week so their rolling week is Sunday at 0000 to Sunday at 0000. An operator is just starting covered work so the first maximum average work hour calculation would occur Sunday at 0000 at the end of his 5th week. The next Sunday at 0000 the next calculation would be performed that would encompass weeks 2 through 6. This calculation would continue to be performed each Sunday at 0000 covering the previous 5 weeks.
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> The Saturday night shift begins at 1800 and ends at 0600 Sunday. The licensee has chosen to include the hours from that shift as all belonging to the week the shift starts so the calculation done Sunday at 0000 each week includes the 6 hours that are to be worked on Sunday morning. The licensee's procedures required by 26.27 and 26.203 specify the start and stop times of the week and the method used for counting shifts that bridge the end of the established week.

While the calculation of the maximum average work hour limit occurs at the end of the averaging period, there is a need to be continually calculating the average looking forward to identify potential exceedances of the limit so that the work hours can be adjusted or, as appropriate, waivers can be prepared and fatigue assessments conducted in advance of exceeding the limit.

Partial Averaging Periods:

Partial averaging periods occur when a worker will not be working a full averaging period. There are two cases that must be addressed related to partial averaging periods. The first is a partial week in which case the worker will not be working a full week as established by the licensee (in Example 1 the week was established by the licensee as being from Sunday at 0000 to Sunday at 0000). The work hour limits that apply to a partial week are the limits of 26.205(d)(1) and (2). Because this is not a full work week, the hours worked in this partial week are not included in the calculation of the work hour average completed per 26.207(d)(7)(i).

> Example 2: The operator in Example 1 starts his first shift on Wednesday. Since the week has been established by the licensee as being from Sunday at 0000 to Sunday at 0000 the operator will start out with a partial week. The work hour limits that apply to him from Wednesday to Sunday at 0000 are the limits of 26.205(d)(1) and (2).

Example 3: The licensee in Example 1 exits a unit outage on Tuesday and a worker who had been working outage MDO returns to on-line duties on Wednesday. For the partial week from Wednesday to Sunday at 0000 the worker would work under the limits of 26.205(d)(1) and (2) taking into account the outage hours worked that week.

The second partial averaging case that must be addressed is for a worker who will not be working a full averaging period but will be working as a covered worker one or more full weeks as established by the licensee. The worker must average 54 hrs/week or less averaged over the number of full weeks worked.

> Example 4: An outage worker arrives on site and begins as a covered worker on Wednesday, two and a half weeks before the outage which starts at 0000 on Sunday. For the partial week from Wednesday to Sunday at 0000 the work hour limits of 26.205 (d)(1) and (2) apply. For the two full weeks worked the hours over those two weeks must average 54 hours per week or less.

Beginning a Rolling Averaging Period:

Note: This section addresses options for setting up schedules to start the rolling averaging period. Determining eligibility to transition onto a shift or between covered groups or into a covered group is accomplished using NEI 06-11, Section 7.3.

In the case of a worker who has not been performing on-line covered work (e.g., a covered worker who has been performing covered work under outage MDO, an uncovered worker who has been performing uncovered work, or an individual who is new to the site) and will be transitioning to on-line covered work, there are two options for setting up the schedule to start the rolling averaging period:

1) The schedule established for the worker for the initial averaging period can be set up as a fixed period which averages 54 hours or less. The first week after the initial averaging period is the first rolling week.

   Example 5: An operator just returned from working in the unit outage for the past 5 weeks. Since his work history is outage MDO, the schedule for his initial averaging period of 5 weeks needs to be established as a fixed schedule such that when the first averaging calculation is performed on Sunday at 0000 at the end of the 5^{th} week of on line work, it averages 54 hours per week or less.

   Example 6: A maintenance crew has been working in a unit outage for the past 6 weeks. The outage ends on Wednesday and the crew is off until the next Monday. The next Monday an on-line emergency diesel outage is scheduled for the next 14 days. The fixed work schedule for this crew will be set up as follows for the first 6 weeks following the outage to ensure compliance with the 54 hour average alternative. The average work hours at the end of the 6 week averaging period is less than 54 hours per week.

S	M	T	W	T	F	S
	12	12	12	12	12	12
	12	12	12	12	12	12
	8	8	8	8	8	
	8	8	8	8	8	
	8	8	8	8	8	
	10	10	10	10	10	

Example 7: A maintenance worker on a 12-hour shift schedule has worked the following schedule as an uncovered worker. The following Monday he is going to begin covered work. Since, in accordance with NEI 06-11, Section 7.3, he meets the work hour and break limits, including having a 34 hour break in the last 9 days, and has had sufficient days off in the last week, he is eligible to transition to covered work and begin a fixed averaging period that averages 54 hr/wk or less.

S	M	T	W	T	F	S
	12	12	12	12	12	
	12	12	12	12	12	
	12	12	12	12	12	
	12	12	12	12	12	
	12	12	12	12	12	
	10	10	10	10	10	

2) The averaging period for the worker is determined and the hours for the past number of work weeks equal to the averaging period are calculated to establish the history needed to begin rolling.

   Example 8: An operator is coming back on shift after working in Operations Support as a procedure writer for the past year. The averaging period for his shift is 5 weeks. Since his hours for the past 5 weeks are known and averaged less than 54 hours per week, his work history can be established and his work hour average can be calculated at 0000 on Sunday at the end of his first week he is back on shift and each Sunday at 0000 following.

Truncated Averaging Periods (these apply only to Item 1 above under Beginning a Rolling Averaging Period):

In the case where a fixed schedule has been set up for a worker to establish the history needed to begin the rolling averaging period, unforeseeable events could cause that schedule to be truncated prematurely due to events largely outside of the licensee's control. When such an event occurs, the licensee shall be considered to be in compliance with the rule if the schedule for the averaging period would have met the maximum average work hour limit had it not been truncated. Examples of events that could lead to unforeseeable truncation of the period are:

- An unexpected unit outage,
- A declared emergency, as defined in the licensee's emergency plan, or
- Duties with the licensee are terminated
- An unplanned security system outage (security only)
- An increased threat condition (security only)

Following such an event, a licensee may:

- Start a new averaging period, or
- Choose not to truncate the averaging period

Extended absence:

An extended absence (e.g., vacations, short-term disability) is not considered an interruption or truncation of an averaging period but is considered part of the averaging period.

> Example 9: A security officer is in the 4th full week of their initial averaging period when he notifies his supervisor he is resigning. At the point when he left the position as a covered worker his work hour average for the first 3 weeks of the averaging period was 56 hrs/week but the average for the entire averaging period would have been 52 hrs/week had he completed the initial averaging period as scheduled. The licensee in this case would be considered to be in compliance with the rule.

If the licensee truncates an initial averaging period of their own volition, then the worker needs to meet the 54 hr/wk limit for the weeks worked.

Force-on-force tactical exercises:

The rule permits licensees who implement the proposed alternative during non-outage periods to exclude from the proposed 26.205(d)(7) calculations the hours worked by security personnel during the actual conduct of NRC-evaluated force-on-force tactical exercises. In practice, licensees should exclude from the calculation of hours worked during the actual conduct of NRC-evaluated force-on-force tactical exercises only those hours worked in excess of 54 hours during the week of the exercise.

NEI 06-11, Section 7.5, Reset from Deviations:

Section 7.5 provides guidance on how to restore a person to compliance with work hour requirements when a deviation from those requirements has occurred. This guidance currently ensures actions are in place to meet the MDO requirements for the current shift cycle. For the purposes of applying this guidance to the maximum average work hour alternative, instead of ensuring that the individual will meet MDO requirements, the licensee should ensure they will meet the maximum average work hour requirement for the current averaging period.

> Example 10: A worker is a covered worker with a 5 week averaging period. They worked the schedule below for weeks 1 through 5. The 72 hour work week in week 5 has

caused a deviation of the maximum average work hour requirement. To reset from this deviation, they are limited to 30 hours in week 6 to return to compliance with the maximum average work hour requirement.

Week 1	40	Work Hr Average
Week 2	60	
Week 3	60	
Week 4	48	
Week 5	72	56
Week 6	30	54

Waivers for 26.205(d)(7) Work Hour Controls

Licensees may issue waivers in accordance with 26.207 for workers to exceed the maximum average of 54 hours/week. A waiver and a fatigue assessment must be conducted for each work period while the worker is in excess of the limit.

Example 11: A worker has the following schedule, and emergent work is necessary to mitigate or prevent a condition adverse to safety on the Friday and Saturday of the last week such that the weekly average will be 58 hours/week. The licensee must make a determination that waiver use is justified and must document waiver use as required by 26.207. A face-to-face supervisory assessment must be conducted and documented for the affected worker no more than 4 hours before work is conducted for each work period. This will result in the reporting of two waivers of the maximum average 54-hour limit in the annual FFD report required per 26.203(e). In accordance with NEI 06-11, Section 7.5, Reset from Deviations, the schedule for week 7 would have to be established to restore compliance. A waiver would not be required for any work periods in week 7 as long as the hours worked that week do not exceed the maximum number of hours allowable to restore compliance with the 54 hour average at the end of week 7.

	Original Schedule – AVG 54 compliant						
Wk	S	M	T	W	T	F	S
1		12	12	12	12	12	
2		10	10	10	10	10	
3		10	10	10	10	12	
4		12	12	12	12	12	
5		10	10	12	12	10	
6		12	12	12	12		

	Modified Schedule – Waivers Required						
Wk	S	M	T	W	T	F	S
1		12	12	12	12	12	
2		10	10	10	10	10	
3		10	10	10	10	12	
4		12	12	12	12	12	
5		10	10	12	12	10	
6		12	12	12	12	12	12